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# GGSIPU chamistry 2011

1. Assertion (A) The radial probability distribution curves of 1s,2p,3d-orbitals are identical in shape. Reason(R) The number of nodal planes present in these orbitals are different.

(a) Both (A) and (R) are true and (R) is the correct explanation of (A)

(b) Both (A) and (R) are true and (R) is not the correct explanation of (A).

(c) (A) is true and (R) is false

(d) (A) is false but (R) is true.

2. Which one of the following have largest mass?

(a) 5.6 L $CO_2$ at STP

(b) 2 g $H_2$ gas

(c) $6x10^{22}$ molecules of $H_2$ gas

(d) 1.0 g-atom of He gas

3. The correct statement is

(a) most probable velocity of gas molecules increases with increase in temperature

(b) the fraction of gas molecules having most probable speed decreases with the rise in temperature

(c) at given temperature,the rms speed of the gas is maximum while most probable speed is ma,ximum

(d) All the above

4. $CH_3-C\equiv C-CH_3$ —(Birch reduction)→ X; —(Lindlar catalyst)→ Y

X and are respectively.

(a) Trans-but-2-ene, cis-but-2-ene
(b) Cis-but-2-ene, trans-but-2-ene

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(c) Tarns-but-2-ene, trans-but-2-ene

(d) Cis-but-2-ene, cis-but-2-ene

5. $CH_3-CH=CH_2 + HCl \xrightarrow[\text{Peroxide}]{\text{Organic}} A$ (Major)

The product A is

(a) $CH_3-\underset{\underset{0}{|}}{CH}-CH_3$
CL

(b) $CH_3-CH_2-CL$

(c) $CH_2-\underset{\underset{0}{|}}{CH}=CH_2$
CL

(d) $CH_3-CH=\underset{\underset{CL}{|}}{CH}$

6. Which of the following is not an anti ferromagnetic?

(a) $V_2O_3$ (b) $Ti_2O_3$

(c) $Fe_2O_3$ (d) $Mn_2O_3$

7. A compound of A and B crystallizes in a cubic lattice in which the A atoms occupy the lattice points at the corners of the cube.The B atoms occupy the centre of each fcc of the cube. The probable formula of the compound is

(a) $A_3B$ (b) AB

(c) $AB_3$ (d) $AB_2$

8. The average molecular mass of colloids can be determined by

(a) Tyndall effect

(b) Brownian movement

(c) Osmotic pressure

(d) flocculation

9. Cottrell smoke precipitator works on the principle of

(a) neutralization

(b) distribution law

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(c) le-Chatlier principle

(d) addition

10. The only non-metallic element exists in liquid state is

(a) $F_2$ (b) $Br_2$

(c) $CL_2$ (d) Hg

11. Which of the following set of elements mostly occur as sulphide ores?

(a) Zn,Cu,Na (b) Zn,Cu,Pb

(c) Fe,AL,Ti (d) Cu,Ag,Au

12. The maximum amount of $CaCO_3$ that can be obtained from 4 g of calcium as per the sequence of reactions is

$Ca \rightarrow CaO \rightarrow CaCO_3$

(a) 20 g (b) 40 g

(c) 10 g (d) 80 g

13. The standard Gibbs energy change for the formation of propane $C_3H_8(g)$ at 298 K is [Given $a H^0_f$ of propane is -103.85 kj/mol;

$S^0_m\ C_3H_8(g) = 270.0\ JK^{-1}\ mol^{-1}$;

$S^0_m\ H_2(g) = 1309.68\ JK^{-1}\ mol^{-1}$;

$S^0_m$ C(graphite) = 5.79 $JK^{-1}\ mol^{-1}$;]

(a) -12.34 kcal (b) -10.98

(c) 12.354 kcal (d) 10.98 kcal

14. One molal aqueous solution of $PdCL_4.6H_2O$ has a freezing point 269.28 K. Assuming 100% ionization of complex, calculate the moleculasr formula of the complex.

[$K_f$ for water = 1.86 K kg $mol^{-1}$] The salt is a hydrated complex.

(a) $[Pd(H_2O)_2CL_4].4H_2O$
(b) $[Pd(H_2O)_3CL_3]Cl.3H_2O$
(c) $[Pd(H_2O)_4CL_4].Cl_4.2H_2O$
(d) $[Pd(H_2O)_6]Cl_4$

15. Standard reduction potential values for the electrodes are given below

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$Mg^{2+} + 2e^- \rightarrow Mg$; $E^0 = -2.37$ V

$Zn^{2+} + 2e^- \rightarrow Zn$; $E^0 = -0.76$ V

$Fe^{2+} + 2e^- \rightarrow Fe$; $E^0 = -0.44$ V

Which of the .following statements is correct?

(a) Zinc will reduce $Fe^{2+}$
(b) Zinc will reduce $Mg^{2+}$
(c) Mg oxidizes Fe
(d) Zinc oxidizes Fe

16. Which of the following is true regarding periodicity of elements?

(a) Elements of same group are characterized by same valence shell electronic configuration.

(b) The most electropositive elements are positioned on right hand side of the Modern periodic Table

(c) On going from Li to F there would be decrease in ionization energy .

(d) reducing property of elements increases from Na to Cl in 3rd period elements.

17. Which of the following pairs have same EAN value?

(a) $[Ni(CO)_4]$, $[Fe(CN)_6]^{4-}$

(b) $[Ni(en)_2]$, $[Fe(H_2O)_6]^{2+}$

(c) $[Co(CN)_6]^{3-}$, $[Fe(CN)_6]^{4-}$

(d) All the above

18. Relative stabilities of the following structures of $CH_2 = CH-CHO$ are

(In this decreasing order)

$CH_2 = CH-C-H$

$\|$

O

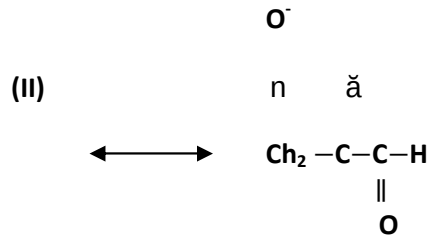
(I) +

$\longleftrightarrow$ $CH_2 - CH = C - H$

0

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(a) II>I>III (b) I>II>III

(c) III>II>I (d) I>III>II

19. One mole of $N_2$ gas at 0.8 atm takes 38 s to diffuse through a pinhole, wheras one mole diffuse. MM of unknown gas is

(a) 126 (b) 64

(c) 252 (d) 80

20. Which of the following sets of quantum numbers are not possible?

I. n=0 l=0 m=0 s= + ½

II. n=1 l=0 m=0 s= - ½

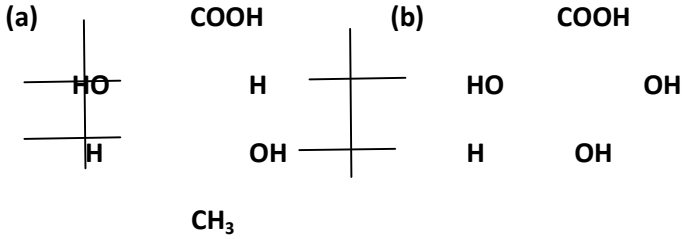
III. n=3l=2 m=-3, s= + ½

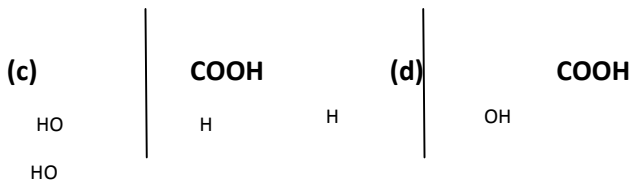
IV. n=2 l=1 m=0 s= - ½

(a) II and III (b) III and IV

(c) I and III (d) I and IV

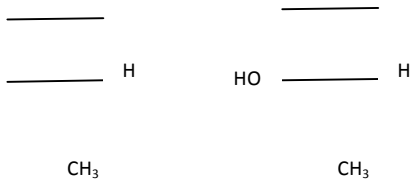
21. 2R, 3S – 2, 3-dihydroxybutanoic acid is




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22. $Y \xleftarrow[300^0C]{O_2/Ag}$ $\xrightarrow{S_2CL_2}$ $CH_2 = CH_2$ X

I. X is a war gas

II. X is a thiol

III. Y is a heterocyclick, aromatic

IV. Y is an isomer of ethanol, correct statements are

(a) I,IV (b) I,III,IV

(c) I,III (d) I,II,III,IV

23. Regarding the mechanism of electrophilic substitution, the falsa statement is

(a) rate limiting step is formation of arenium ion

(b) arenium ion can stablise through resonace

(c) arenium ion is aromatic

(d) initial step is generation of electrophile

24. Identify incorrect statements.

I. Halo group activates benzene ring by mesomeric effect and destabilizes it by inductive effect

II. Halo group is deactivating group

III. Benzene is $10^4$ times more reactive than nitrobenzene towards nueleophile

IV. $CF_3$ is a strongly deactivating group

(a) I,II,III (b) III only

(c) II only (d) II,IV

25. Number of moles of hydrogen atoms required to get one mole of hydrazobenzene from nitrobenzene is

(a) 10 (b) 5 (c) 8 (d) 4

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26. Fischer esterification is

(a) nucleophilic substitution reaction

(b) electrophilic substitution reaction

(c) electrophilic addition reaction

(d) free redical substitution reaction

27. Which of the following can be used in making floor polish?

(a) Aniline

(b) Benzaldehyde

(c) Nitrobenzene

(d) Benzene diazonium chloride

28. The standard electrode potentials of four elements P,Q,R and S are -2.65, -1.66, -0.80 and +0.86 V. The highest chemical activity will be exhibited by

(a) Q (b) P

(c) S (d) R

29. Ethylene glycol is used as coolant in car radiators, in order to prevent the solution from freezing at $-0.3^0$C. The amount of ethylene glycol to be added to 5 kg of water is (For water $K_f = 1.86\ km^{-1}$)

(a) 20 g (b) 50 g

(c) 40 g (d) 30 g

30. Electrolysis of dilute aqueous NaCL solution was carried out by passing 10 mA current. The time required to liberate 0.01 moles of $H_2$ gas at the cathode is

(a) $9.65x10^4$ s (b) $19.3x10^4$ s

(c) $28.95x10^4$ s (d) $38.6x10^4$ s

31. The half-life period if the first order chemical reaction is 6.93 min. The time required for the completion of 99% of the chemical reaction will be (log2 = 0.3010)

(a) 230.3 min (b) 23.03 min

(c) 46.06 min (d) 460.6 min

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**32. Solutions A,B,C and D are respectively 0.1 M glucose, 0.05 M NaCL, 0.05 M $BaCL_2$ and 0.1 M $ALF_3$. Which one of the following pairs is isotonic?**

**(a) A and C (b) b and C**

**(c) A and B (d) A and D**

**33. p[H of $CH_3COOH$ and $CH_3COONa$ buffer is 4.8. In which of the following conditions, the buffer capacity will be maximum?**

| | $[CH_3COOH]$ | $[CH_3COONa]$ |
|---|---|---|
| **(a)** | **0.1 M,** | **0.2 M** |
| **(b)** | **0.2 M** | **0.1 M** |
| **(c)** | **0.34 M** | **0.34 M** |
| **(d)** | **0.34 M** | **0.30 M** |

**34. 50 mL of sample of hard water gave good lather with 6 mL of standard soap solution (1 mL soap solutions = 1 mg $CaCO_3$). If the hardness is only due to $Mg(HCO_3)_2$, the weight of milk of lime required to remove the hardness completely from 100 kg of that sample of water is**

**(a) 17.8 g (b) 8.9 g**

**(c) 178 g (d) 89 g**

**35. 0.2 g of an organic compound gave 0.17 g $NH_3$ in kjeldhal's method. The percentage weight of nitrogen in the given compound is**

**(a) 60% (b) 80%**

**(c) 70% (d) 90%**

**36. At constant temperature,the kinetic energy of a gas is independent on**

**I. pressure II. Volume III. Density**

**(a) I,II (b) II,III**

**(c) I,III (d) I,II,III**

**37. 33.6 L of water vapour at STP are condensed to liquid state. The volume occupied by it is approximately**

**(a) 1 mL (b) 18 mL**

**(c) 27 mL (d) 127 mL**

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38. A open vessel containing air at $27^0$ is heated to $127^0$C. The fraction of air originally present in the bottole that is expelled is

(a) 50% (b) 25%

(c) 33% (d) 40%

39. Which one is correct for $k = Ae^{-E_a / RT}$

(a) $E_a$ is energy of activation

(b) R is Rydberg's constant

(c) K is equilibrium constant

(d) A is adsorption

40. A reaction involving two different reactants can never be

(a) unimolecular reaction

(b) I order reaction

(c) II order reaction

(d) bimolecular reaction

41. The number of d® - p® bonds present respectively in $SO_2$,$SO_3$,$CLO^-_4$ are

(a) 0,1,2 (b) 1,2,3

(c) 2,3,4 (d) 2,3,3

42. How many unit cells are present in a cubic shaped ideal crystal of NaCL of mass 1.0 g?

(a) $1.28x10^{21}$ (b) $1.71x10^{21}$

(c) $2.57x10^{21}$ (d) $5.14x10^{21}$

43. 20 mL of a sample of $H_2O_2$ gives 400 mL oxygen masured at NTP. The sample should be labeled as

(a) 5 V $H_2O_2$

(b) dil. $H_2O_2$

(c) anhy.$H_2O_2$

(d) 20 V $H_2O_2$

44. Identify the correctly matched lists

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| | List I | | List II |
|---|---|---|---|
| (i) | Total number of lines in H-spectrum for a transition 5 -> 1 | (A) | Decreases |
| (ii) | Intensity of spectral line in the spectrum, as n value increases | (B) | H-spectrum |
| (iii) | Band spectrum is due to | (C) | 10 |
| (iv) | The proof for the presence of energy levels in an atom | (D) | Rotations and vibrations of atoms in molecules in addition to electronic transition |
| | | (E) | Increases |

(a) (i)-A, (ii)-E, (iii)-D, (iv)-B
(b) (i)-E, (ii)-E, (iii)-D, (iv)-D
(c) (i)-C, (ii)-A, (iii)-D, (iv)-B
(d) (i)-C, (ii)-E, (iii)-D, (iv)-B

45. Between any two of following molecules, hydrogen bonding is not possible
(a) two primary amine molecules
(b) two secondary amine molecules
(c) two tertiary amine molecules
(d) two ammonia molecules

46. Which of the following elementys does not show +4 oxidation state?
(a) Zr (b) Pt
(c) La (d) Ti

47. The pH of staturated aqueous solution of $NaCLO_4$ is 10. If the $K_{sp}$ of $Ba(OH)_2$ is $5x10^{-13}$, the concentration of $ba^{2+}$ ions in the solution is
(a) $1 \times 10^{-2}$ (b) $1x10^{-3}$
(c) $5 \times 10^{-5}$ (d) $1 \times 10^{-5}$

48. B $\xleftarrow{Y}$ 2-butyne $\xrightarrow{X}$ A. A and B are geometrically isomers. 'A' is more symmetrically than 'B'. 'B' has higher heat of hydrogenation than 'A'. Then 'X' and 'Y' are respectively

(a) Li/Liq $NH_3$, $H_2$/Lindlar's catalyst

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(b) Li/Liq. $NH_3$, Na/Liq. $NH_3$

(c) $H_2$/Lindlar's catalyst, Na/Liq.$NH_3$

(d) $H_2$/Pt, $H_2$/Lindlar's catalyst

49. Pick the correct statements.

I. The repeating unit of polyacetylene contains C=C bond

II. Acetylene ozonide involves $sp^3 - sp^3$ overlap

III. Alkyne with maximum number of acidic hydrogen atoms is ethyne

IV. Ozonolysis product of acetyleneproduct of acetylene is a dial

(a) I, II, III (b) II,III,IV

(c) I,II,III,IV (d) I,IV

50. Regarding urea the correct statements are A. it is a monoiacidic base

A. it is a monoacidic base

B. dipole moment = 0

C. C-N bondorder is 1

D. it exhibits resonance

(a) A,D (b) B,C,D

(c) A,B,D (d) C,D

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